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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,249	01/23/2004	John Minkoff	0918.0227C	4502
27896	7590	07/28/2005	EXAMINER	
EDEL, SHAPIRO & FINNAN, LLC 1901 RESEARCH BOULEVARD SUITE 400 ROCKVILLE, MD 20850			MULL, FRED H	
			ART UNIT	PAPER NUMBER
			3662	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/762,249

Applicant(s)

MINKOFF ET AL.

Examiner

Fred H. Mull

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9,12-21,23-30,32 and 33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9,12-21,23-30,32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is/are objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments on p. 9, with regard to various objection(s), have been fully considered and are persuasive. The objections have been withdrawn.
2. Applicant's arguments on p. 9-11, with respect to the rejection(s) over Castella, Godara, Drane and Jacobsen have been fully considered and are persuasive. The rejection(s) of these claims have been withdrawn.
3. Applicant's arguments on p. 9-11, with respect to the rejection(s) of over Friedlander have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of applicant's amendment.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 3, 12-21, 23, 30, and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedlander in view of any one of Russell, Aoki, Sullivan, Ghose, Spirtus, and Lidenblad.

In regard to claims 1, 13, 15, 30 33, Friedlander discloses:

selecting a plurality of angular directions at which nulls are to be located in an antenna radiation pattern of the phased array antenna (section II), where M_l are the

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interferers to be nulled (section II, 1st ¶), and V_i are the vector directions of the interferers to be nulled (section II, 5th ¶, equation 4b);

computing a radiation shaping transformation as a function of the selected angular directions by constructing a plurality of vectors corresponding to the selected angular directions at which the nulls are to be located and computing a matrix whose product with each of the vectors is zero (section II, 6th ¶, including the equation: $D^H V_i = 0$); and

determining from the radiation shaping transformation an amplitude and phase distribution over the array of antenna elements that forms the antenna beam with nulls of the antenna radiation pattern at the selected angular directions, wherein the amplitude and phase distribution is determined from the matrix (section II, 6th ¶), where D^H is a weight vector (section II, 6th ¶, line 2).

Friedlander fails to disclose a transmit antenna, instead describing a receiver antenna.

However, it is well known that many communication systems are two-way, and to associate a transmitter with a receiver for this purpose. It is further well known that interference that affects reception signals can affect transmission signals as well.

Russell (col. 5, lines 50-58), Aoki (abstract; col. 2, lines 51-58), Sullivan (col. 11, 25-54), Ghose (col. 9, line 11 to col. 10, line 9), Spirtus (¶11), and Lidenblad (col. 1, line 47 to col. 2, line 8) disclose transmission in the same direction as reception. It would have been obvious to steer transmission nulls in the transmitted signal in the same direction as the reception nulls in the received signal so that the transmitted

signals are not affected by the interference. In other words, since the receiver has already determined the direction of the interference, the transmitter makes use of this information.

In regard to claims 3, 14, and 23, Friedlander further discloses the phased array antenna comprises M antenna elements, k angular directions are selected at which nulls are to be located, and the matrix is an $M \times M$ matrix of rank $M-k$ (section II).

In regard to claims 12 and 32 it is well know to use a Gram-Schmidt orthogonalization procedure to solve for the matrix in an equation of the form: matrix * vector = zero vector.

In regard to claims 16-21, Friedlander discloses a null-steering algorithm to be used with an antenna array, and does not discuss the structure of an actual antenna array. It would have been obvious that the antenna array would include standard structures such as attenuators, amplifiers, and phase shifters.

1. Claims 4-9 and 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedlander and any one of Russell, Aoki, Sullivan, Ghose, Spirtus, and Lidenblad, as applied to claims 1 and 15, and in further view of Castella, previously cited.

In regard to claims 4-9 and 24-29, Castella discloses applying amplitude tapering to the phased array antenna to reduce sidelobe levels of the antenna radiation pattern relative to a uniform illumination radiation pattern (abstract, lines 5-9).

It would have been obvious to include the amplitude tapering of Castella to reduce the sidelobe levels in the system of Friedlander et al.

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2. Claims 1, 3, 12-21, 23, 30, and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedlander and any one of Russell, Aoki, Sullivan, Ghose, Spirtus, and Lidenblad, as applied to claims 1, 3, 12-21, 23, 30, and 32-33, and in further view of Cranor.

Even if weight vector of Friedlander comprises phase-only or amplitude-only weights, rather than phase and amplitude weights, Cranor teaches the interchangeability of weighting by phase-only, amplitude-only, and both phase and amplitude, and that "[t]he choice is a matter of convenience" (p. 5, ¶1).

3. Claims 4-9 and 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedlander, any one of Russell, Aoki, Sullivan, Ghose, Spirtus, and Lidenblad, and Castella, as applied to claims 4-9 and 24-29, and in further view of Cranor.

Even if weight vector of Friedlander comprises phase-only or amplitude-only weights, rather than phase and amplitude weights, Cranor teaches the interchangeability of weighting by phase-only, amplitude-only, and both phase and amplitude, and that "[t]he choice is a matter of convenience" (p. 5, ¶1).

4. The examiner also finds the following reference(s) relevant:

Godara, previously cited, which teaches creating a null in the \mathbf{s}_0 direction by determining a matrix \mathbf{B} such that: $\mathbf{s}_0^H \mathbf{B} = \mathbf{0}$. (p. 1205, section F, ¶4).

Roederer, which teaches determining properties of an equivalent receiver based on the description of a transmitter (col. 1, lines 27-44).

Applicant is encouraged to consider these documents in formulating their response (if one is required) to this action, in order to expedite prosecution of this application.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

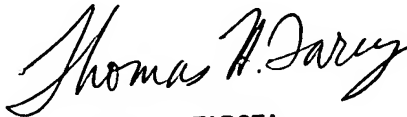
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred H. Mull whose telephone number is 571-272-6975. The examiner can normally be reached on M-F 9:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas H. Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Fred H. Mull
Examiner
Art Unit 3662

fhm


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